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CONTENTS:

Two new North American Dragonflies (Odonata).

BY E. B. WILLIAMSON.

Boyeria grafiana n. sp.

Abdomen ♂, 48-51; ♀, 46½-47½ mm.

Hind wing ♂, 40-43; ♀, 43 mm.

Specific characters: Body colors, especially the thorax, generally black and gray with little trace of the fulvous which characterizes *B. vinosa.* The dark brown basal wing spots of *vinosa* reduced to a trace, and the wing membrane clear hyaline (excepting more or less fumose beyond the stigma) as contrasted with the decided fulvous of *vinosa;* venation less complex than in *vinosa.* Stigma paler than in *vinosa* and .5 mm. shorter. A decidedly more robust species than *vinosa;* four dried males of *grafiana* weighed 12 grains, and four of *vinosa* weighed 9½ grains.

♂.—Abdominal appendages variable but similar to those of *vinosa,* generally more robust (two males of *grafiana* and *vinosa* from Ohio Pyle, Penna., Sept. 23, 1906, have the superior appendages respectively 4½ and 5½ mm. long) with the sub-basal inferior tooth less developed, and the inferior appendage dark colored and not yellow as in *vinosa.* Abdominal segments 9 and 10 similar in general color, greenish blue, while in *vinosa* segment 10 is fulvous and 8 and 9 are decidedly more brown than 10.

♀.—Abdominal appendages very short, about the length of segment 10; in *vinosa* the appendages are at least 1½ times the length of 10.

Color comparison of males based on two of each species collected by J. L. Graf at Ohio Pyle Penna., Sept. 23, 1906.

B. vinosa.	*B. grafiana.*
Face green obscured with brownish.	Clear green.
Dorsal thoracic stripes narrow, each divided for a short distance.	Wider, continuous but narrowed where the separation occurs in *vinosa.*
Mesepimeron and metepimeron each with an inferior rounded yellow spot.	Each with a rounded blue spot, the spot on the metepimeron showing traces of yellow.
Mesepimeron and metepisternum each with a small bluish spot at base of wings.	Spots larger and more distinctly blue.
Metepimeron uniform brown with exception of yellow spot mentioned above.	With a large distinct blue spot at wing base.
Wing bases above and between the wings with few inconspicuous blue spots.	With distinct and more numerous clear blue spots.
Abdominal segment 2 from above with small median basal spot, and a transverse apical spot which is interrupted at the median line.	Similar and also with a spot at the median transverse carina similar to the apical spot.
Segments 3-5 each with a very small apical spot on either side of the median line.	Spots clearer and more sharply contrasted with the surrounding color.
Segments 3-8 each with a very small obscure pale spot at the transverse carina, each spot divided by the dorsal median longitudinal carina.	Spots clear blue, sharply defined.
Apical half of 8 and all of 9 and 10 obscure brownish yellow, each with a dorsal median brown area; 10 decidedly more yellow than 8 and 9.	8 brownish with a wide black median longitudinal stripe back of the transverse carina; 9 and 10 pale greenish blue, but little if any obscured and with black markings more distinct and definite than the brown markings in *vinosa.*
Seen from the side segments 4-8 each with a very small obscure yellowish spot below, the transverse carina dividing each spot more or less completely into two spots.	Spots large, clear blue, the color following up the transverse carina to the dorsal spots.
Superior appendages dark brown, inferior yellow, extreme apex dark.	Both superiors and inferior dark brown.
Width of head, 9 mm.	10 mm.

Venational characters based on tabulation of 10 males of each species.

Antenodals in front wing .	17	18	19	20	21	22	23	24	25	26		Average.
Boyeria vinosa		1=5%	1=5%		3=15%	4=20%	3=15%	5=25%	1=5%	2=10%		22.7
Boyeria grafiana	1=5%	2=10%	1=5%	5=25%	2=10%	6=30%	2=10%	1=5%				20.8
Antenodals in hind wing . .	13	14	15	16	17	18	19	20				
Boyeria vinosa	1=5%	1=5%		4=20%	6=30%	4=20%	3=15%	1=5%				17.1
Boyeria grafiana		1=5%		11=55%	8=40%							16 25
Postnodals in front wing . .	15	16	17	18	19	20	21	22	23			
Boyeria vinosa				1=5%	10=50%	2=10%	3=15%	1=5%	3=15%			20 1
Boyeria grafiana	1=5%	3=15%		2=10%	6=30%	5=25%	1=5%	2=10%				18 8
Postnodals in hind wing . .	17	18	19	20	21	22	23	24				
Boyeria vinosa	2=10%	2=10%	2=10%	3=15%	2=10%	3=15%	3=15%	3=15%				20.85
Boyeria grafiana	4=20%	7=35%	3=15%	3=15%	1=5%		1=5%					17.75
Cross veins in median space of front wing	3	4	5	6	Same of hind wing.				3	4	5	6
Boyeria vinosa		2=10%	12=60%	6=30%						5=25%	13=65%	2=10%
Boyeria grafiana	1=5%	16=80%	2=10%	1=5%					6=30%	12=60%	2=10%	
Cross veins in cubital space of front wing, not counting one forming subtriangle	3	4	5	6	7	Same of hind wing.			3	4	5	6
Boyeria vinosa	1=5%	9=45%	7=35%	3=15%					1=5%	11=55%	6=30%	2=10%
Boyeria grafiana		10=50%	9=45%		1=5%				2=10%	13=65%	5=25%	
Transverse cross veins in triangle of front wing . . .	3	4	5	Same of hind wing	2	3	4	Cells in anal triangle.		3	4	5
Boyeria vinosa	6=30%	12=60%	2=10%		1=5%	13=65%	6=30%			6=30%	2=10%	12 60%
Boyeria grafiana	11=55%	9=45%			5=25%	14=70%	1=5%			15=75%	1=5%	4=20%
Rows of cells between M_2 and R_5 at widest point . .	3	4	Rows of cells between R_5 and radial supplement in front wing.				1	2	Same in hind wing.		1	2
Boyeria vinosa	21=52.5%	19=47.5%					6=30%	14=70%			11=55%	9=45%
Boyeria grafiana	40=100%[1]						6=30%	14=70%			16 80%	4=20%
Rows of cells between M_4 and median supplement .	1	2	Rows of cells between Cu_2 and hind margin of wing at widest point in hind wing.					4	5	6	7	8
Boyeria vinosa	4=10%	36=90%							2=10%	5 25%	12 60%	1=5%[2]
Boyeria grafiana	10=25%	30=75%						1=5%	3=15%	15=75%	1=5%	

[1] In front wing of a ♂ from Searchmont, Ontario, practically only 2 rows, as there is only one transverse row of 3 cells.

[2] In this ♂ from Muncie, Indiana, in one front wing and both hind wings Sc is carried beyond the nodus the length of one cell.

Material studied.—With the exception of two males of *vinosa* and one male of *grafiana,* all from Old Forge, N. Y., in the collection of Professor Needham, this material is in my collection. Fifty-two males and seven females of *vinosa,* and fourteen males and two females of *grafiana* have been studied.

B. vinosa.—Little Jelloway, Knox County, Ohio. August 18, 1905, ♂, J B. Parker.

Winona Lake, Indiana, 1901, ♂, E. B. Williamson.

Muncie, Indiana, July 11, 1903, taken in window in a store, ♂, E. B. Williamson.

Russell Stream, N. E. Carry, Maine, August 28, 1899, 8 ♂♂, F. L. Harvey.

Millinocket, Maine, Stone Dam, September 4, 1903, ♀, indicated as taken in copulation with a ♂ *Æshna sp.*

Old Forge, New York, August 22, 1905, 2 ♂♂, J. G. Needham.

Ohio Pyle, Penna. All collected by J. L. Graf. September 8, 1901, 3 ♂♂; September 10, 1905, 8 ♂♂, 4 ♀♀; October 1, 1905,. 2 ♂♂; September 23, 1906, 2 ♂♂, 1 ♀.

Heyden, Ontario, Canada. Collected by E. B. Williamson. July 31, 1906, ♀; August 2, 1906, 5 ♂♂; August 3, 1903, ♂.*

Searchmont, Ontario, Canada. Collected by E. B. Williamson. August 6, 1906, 7 ♂♂; August 7, 1906, 3 ♂♂; August 8, 1906, 6 ♂♂; August 9, 1906, 2 ♂♂.

B. grafiana.—Cave Branch, Ky., August 28, 1898, ♂, J. S. Hine.

Old Forge, New York, August 22, 1905, ♂, J G. Needham.

Ohio Pyle, Penna. Collected by J. L. Graf. September 10, 1905, ♂; September 24, 1905, ♂; October 1, 1905, ♂; September 23, 1906, 2 ♂♂.

Heyden, Ontario, Canada. Collected by E. B. Williamson. August 2, 1906, ♂.

Searchmont, Ontario, Canada. Collected by E. B. Williamson. August 6, 1906, 2 ♂♂; August 8, 1906, 3 ♂♂; August 9, 1906, ♂, 2 ♀♀.

This species is very properly named for J. L. Graf, a devoted and careful, though withal, silent student of nature, who first detected a difference in the Boyerias at Ohio Pyle. In the autumn of 1905, among a box of specimens he sent me, he indicated on the envelope of a Boyeria, "colors peculiar." In reply to my inquiry, under date of October 4,

*Hawking after sunset.

1905, he wrote, "The variety of *B. vinosa* you mention is not uncommon at Ohio Pyle. I have succeeded in taking three specimens, though I saw a number of others. Their difference from typical *vinosa* is apparent at a glance, even while they are on the wing, their pale blue markings in marked contrast to the almost uniform brown appearance of typical *vinosa*. In manner of flight I could detect no difference in the two varieties. They both prefer the ripples along the river where there are many stones, and their flight is usually just along the water's edge and but a few inches above the rocks. I observed females of typical *vinosa* ovipositing while at rest on rocks in the damp algæ just above the water." In Canada I was able to distinguish the two species readily on the wing by the color of the apical abdominal segments.

As above indicated, I am indebted to Professor Needham for three specimens studied. In his laboratory we examined together some of my material, and he regards *grafiana* as distinct from *vinosa*. Dr. Calvert has sent me notes on venational characters of specimens of the genus in Philadelphia. And on October 11, 1905, Professor Hine wrote me, "There is in the collection here (O. S. U., Columbus, Ohio,) one specimen taken at Orwell, Ashtabula County, Ohio, September, 1894, by E. E. Bogue, and labelled *vinosa*, by Dr. Kellicott. This dragonfly has the characters you mention of the new species."

Somatochlora charadræa n. sp. (*charadræus* Gr., from a mountain torrent).

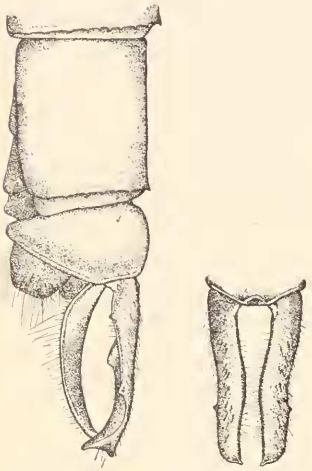
Abdomen, ♂ 35; hind wing 35 mm. (*S. lineuris*, abdomen 45, hind wing 43).

Labium pale yellow; labrum dark yellow, edged with brown; clypeus brown; frons dark yellow, for nearly its entire width above and for a short distance in front, metallic blue; vertex black, the apex yellow; occiput dull yellow; rear of eyes black.

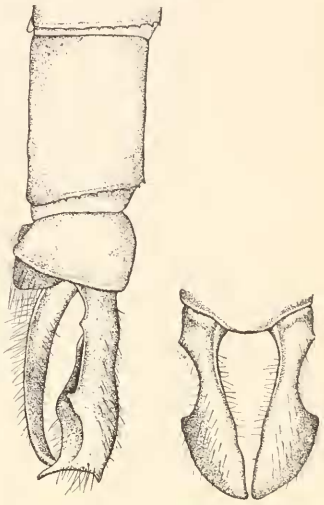
Thorax brown, metallic reflections most evident below on the mesepimeron and metepimeron, each of which has a bright yellow stripe, on the first of nearly uniform width and nearly the length of the sclerite, on the second widened and shortened to form an inferior rounded spot; middorsal carina and interalar sclerites yellow. Costa pale yellow to its termination, and antenodals and nodus largely of the same color; stigma black; all four triangles once crossed;* seven

*Needham, Aquatic Insects in the Adirondacks, N. Y. State Museum, Bulletin 47, 1901, p. 484, in the Key to N. A. genera of Cordulinæ (s. str.) erroneously places *Somatochlora* under his section "*cc* Triangle of hind wing without cross vein, open." Normally *Somatochlora* has this triangle once crossed. Of 40 hind wings of *Somatochlora elongata* which I studied, the triangle in two left wings was not crossed.

antenodals in front wings and five in hind wings; seven postnodals in front wings and eight and nine in hind wings. Legs black, femora of first and second pair, especially the first pair and especially on the inner surface and basally, with light brown.



Figs. 1 and 2.—Appendages of *Somatochlora charadræa*, Bear Creek, Canon, Jefferson Co., Colorado, July 31, 1898, E. J. Oslar, collector. Type ♂, collection E. B. Williamson.



Figs. 3 and 4.—Appendages of *Somatochlora lincaris*, Lake Forest, Illinois, June 27, 1904. ♂, collection J. G. Needham.

Second abdominal segment with a basal, lateral, inferior and a subapical, lateral, superior spot yellow; genital lobe long, yellow, margined with brown; 3 with a basal, lateral, superior and a basal, lateral, inferior spot yellow, these spots not so sharply defined as the markings on 2; remainder of abdomen, including the appendages, black.

Described from a single ♂ in my collection, collected by Ernest J. Oslar, Bear Creek Canon, Jefferson Co., Colorado, July 31, 1898.

So far as form of appendages go, this species finds its closest ally in *S. lincaris*. No other species known to me approaches these two species in this type of appendage. *S. nasalis* is known to me only by DeSely's description of the female, but it certainly cannot be associated with *charadraca*. In addition to differences indicated in the figures of appendages, *charadraca* is separated from *lincaris* by a number of charac-

ters, including size, reduction in number of antenodals and coloration. My type has been examined by both Dr. Calvert and Professor Needham. In the figures of appendages of *charadraea* it should be noticed that the apex of the abdomen has been flattened, so, in profile, segments 9 and 10 appear too wide, and in dorsal view, the apex of 10 is compressed and the superior appendages are crowded together.

Under date of November 14, 1906, Mr. Oslar writes concerning the single specimen:

"I took it at an altitude of about 8000 feet, July 31, 1898, in Bear Creek Canon, Jefferson County, Colorado. At the place I took it there were two, but, on account of its wariness and the almost inaccessible character of its haunts (on willows overhanging the swift and breakneck dashing Bear Creek), I was unable to secure the other specimen. The one captured was taken with difficulty, as it kept just out of reach of the net. It appeared a weak flier, however, and my opportunity came when an unusually strong gust of wind blew it towards me. I have never seen the like of it since, though I have visited the spot a number of seasons. I have always suspected that it might be new."

Notes on Plusiotis beyeri Skinner.

By C. R. Biederman, Palmerlee, Arizona.

Most of the letters I get ordering *P. beyeri*, contain questions about the insect, some complain of the high price, stating that it is reported this species is all over this part of the country and is plentiful. The latter statement is only partially correct, since it is not found above 6,500 or below 4,500 feet. Within that space I have found it for many miles along the Huachuca range. I have known *P. beyeri* since 1904. That season I found two specimens; next year, 1905, four; this season, 1906, I made a special study of this large and handsome *Plusiotis*, and from my experience I may safely conclude the following: That while there are a good many of these beetles within the space mentioned, I have utterly failed